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NOTES ON NEW ENGLAND HEPATICAE.

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THE species noted below are for the most part recent additions to the hepatic flora of New England, several of them in fact being new to the range of Gray's Manual. Attention is also called to a few species which have been variously understood by hepaticologists and which are even now in more or less confusion with regard to their synonymy. All of the species noted, with the exception of *Kantia Sullivantii* and *Radula obconica*, also occur in Europe. The arrangement follows that of Schiffner in Engler and Prantl's "Die Natürlichen Pflanzenfamilien."

1. RICCIA CRYSTALLINA L. A few specimens of this well known species were collected by E. B. Harger at Oxford, Connecticut, in 1898. The plant has a rather wide distribution in North America but has not hitherto been reported from any stations nearer than Illinois.

2. GYMNOMITRIUM CORALLIOIDES Nees, Naturgeschichte der europ. Lebermoose, 1: 118. 1833. *Acolea corallioides* Dumort. Recueil d'Obs. sur les Jung. 23. 1835. *Cesia corallioides* Carruth. Jour. Bot. 3: 300. 1865. A few fragments of this distinctly alpine species were found in 1897 by Professor Farlow on Mt. Washington, and during the past summer the writer collected several additional specimens along the Crawford Bridle Path. The only North American stations for the species which have hitherto been recorded are Alaska, the Yukon Territory and Greenland, and its discovery in the White Mountains is therefore of much interest. *G. corallioides* often grows in company with *G. concinnatum*, which is rather abundant in the White Mountains at high altitudes. The former is however a smaller species with more closely imbricated leaves and its color,

which varies from gray to brownish-black, does not show the yellowish tints which are occasionally seen in the commoner species. *G. coralliioides* is further distinguished by its hyaline leaf-margins.

3. Marsupella ustulata (Hüben.) Spruce, Rev. Bryol. **8**: 100. 1881. *Gymnomitrium adustum* Nees, Naturgeschichte der europ. Lebermoose, **1**: 120. 1833 (in part). *Jungermannia ustulata* Hüben. Hep. Germ. 132. 1834 (*teste* Spruce). *Sarcoscyphus adustus* Spruce, Ann. and Mag. Nat. Hist. II. **4**: 196. 1849. *Nardia adusta* Carringt. Brit. Hep. 20. 1874. *Sarcoscyphus Sprucei* Limpr. Jahresb. Schles. Gesell. vaterl. Cultur, **58**: 179. 1881. *Sarcoscyphus ustulatus* Kiær, Christiania Vidensk. Selsk. Forhandl. 1884[12]: 82. *Marsupella adusta* Underw.; A. Gray, Manual, 721. 1890 (not Spruce). *Marsupella Sprucei* Steph. Bull. de l'Herb. Boissier, II. **1**: 156. 1901. The present species is not uncommon in the alpine region of the White Mountains and has been found there by several collectors. It is much smaller than either *M. emarginata* or *M. sphacelata* and may be distinguished also by its very dark purplish-black color and by its paroicous inflorescence. It is probable that other minute *Marsupellae* occur in the higher mountains of New England but none of them have yet been detected with certainty. For a long time it was supposed that *M. ustulata* was identical with *Gymnomitrium adustum* Nees, but, as Limpricht pointed out, this old species was a composite and included two species of *Marsupella* as well as a true *Gymnomitrium*. Reserving the name *adustum* for the latter he gave the name *Sarcoscyphus Sprucei* to one of the species of *Marsupella* and *S. pygmaeus* to the other. A few months later Spruce described *M. ustulata* as a *new species* and applied the name *M. adusta* to the *Gymnomitrium*. This was in accordance with Spruce's view that *Marsupella* and *Gymnomitrium* were not generically distinct. Stephani recognizes both *M. ustulata* and *M. Sprucei* as distinct species, but other European writers consider them to be forms of a single species, an opinion with which the writer would also agree. In the latter case Spruce's name would apparently have to be discarded on account of the slight priority of Limpricht's. According to Pearson,[1] however, Spruce himself came to the conclusion that *M. ustulata* was the same as the old *Jungermannia ustulata* of Hübener, but whether he based his opinion on an examination of Hübener's type does not appear. *J.*

[1] Hep. Brit. Isles, 382. 1901.

ustulata was long ago reduced by Nees von Esenbeck to a synonym of *Sarcoscyphus Ehrharti* (= *Marsupella emarginata*),[1] and until it was revived by Pearson had practically disappeared from hepaticological literature.

4. NARDIA HAEMATOSTICTA (Nees) Lindb.[2] This species was discovered by the writer close to the Crawford Bridle Path in the summer of 1902. Only two other North American localities, Greenland and Alaska, have been recorded.

5. NARDIA HYALINA (Lyell) Carringt. No New England stations for this species are given in the Manual, but apparently it is not uncommon. Specimens from the following localities are in the writer's herbarium: Jerusalem, Maine (*J. F. Collins*); Newfane, Vermont (*M. A. Howe*); Middletown and Hamden, Connecticut (*A. W. E.*). Specimens have also been examined from Massachusetts.

6. LOPHOZIA BICRENATA (Schmid.) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia bicrenata* Schmid. Ic. Plant. 3: 250. *pl. 64, f. 2.* 1797. By most American authors this species has been referred to *J. excisa* Dicks., and it is described under this name in the sixth edition of the Manual. It is probable that the true *J. excisa* was a composite species including among others the *J. bicrenata* of Schmidel, but there is so much uncertainty about it that some European writers have given up the name altogether while others reserve it for *J. capitata* Hook. (= *J. intermedia* Lindenb.), a very different species from *Lophozia bicrenata*. *J. capitata* is described in the Manual as *J. excisa*, var. *crispa* Hook. and has not yet been definitely reported from New England. *L. bicrenata* on the contrary is not uncommon and is usually found growing on the earth in woods or along their borders. It has been collected from near the coast to an altitude of 5000 ft. in the White Mountains and does not vary markedly in different localities. To the description given in the Manual it may be added that the inflorescence is paroicous and that the plants, which are usually more or less tinged with reddish, commonly give off a peculiar aromatic odor. New England specimens from the following stations are in the writer's herbarium: Crawford Bridle Path and Jackson, New Hampshire (*A. W. E.*); Andover,

[1] Naturgeschichte der europ. Lebermoose, **2**: 417. 1836.

[2] A full description of this species by the writer may be found in Proc. Wash. Acad. **2**: 296. 1900.

Vermont (*W. G. Farlow*); Woods Holl, Massachusetts (*A. W. E.*); Orange and Hamden, Connecticut (*A. W. E.*).

7. LOPHOZIA FLOERKII (Web. & Mohr) Schiffn.; Engler & Prantl, Nat. Pflanzenfam. 1[3]: 85. 1893. *Jungermannia Floerkii* Web. & Mohr, Bot. Taschenb. 410. 1807. *J. Naumanni* Nees; Martius, Fl. Crypt. Erlang. 143. *pl. 4, f. 16.* 1817. *J. barbata*, var. *Floerkii* Nees, Naturgeschichte der europ. Lebermoose, **2**: 168. 1836. *J. lycopodioides*, var. *Floerkii* Lindb. Musc. Scand. 7. 1879. Mt. Washington, New Hampshire (*W. G. Farlow, A. W. E.*).

8. LOPHOZIA LYCOPODIOIDES (Wallr.) Cogn. Bull. Soc. roy. Bot. de Belgique, **10**: 278. 1872. *Jungermannia lycopodioides* Wallr. Fl. Crypt. Germ. **1**: 76. 1831. *J. barbata*, var. *lycopodioides* Nees, Naturgeschichte der europ. Lebermoose, **2**: 185. 1836. Mt. Katahdin, Maine (*J. F. Collins*); Thorn Mt. and Carter Dome, New Hampshire (*A. W. E.*).

9. LOPHOZIA LYONI (Tayl.) Steph. Bull. de l'Herb. Boissier, II. **2**: 157. 1902. *Jungermannia quinquedentata* Huds. Fl. Angl. 511. 1762? Web. & Mohr, Bot. Taschenb. 430. 1807? *J. barbata*, var. *quinquedentata* Nees, Naturgeschichte der europ. Lebermoose, **2**: 196. 1836. *J. Lyoni* Tayl. Trans. Bot. Soc. Edinburg, **1**: 116. *pl. 7.* 1844. *Lophozia quinquedentata* Cogn. Bull. Soc. roy. Bot. de Belgique, **10**: 279. 1872. Mt. Kineo, Moosehead Lake, Maine (*M. L. Fernald*); Jackson, New Hampshire (*A. W. E.*); Mt. Mansfield, Vermont (*W. G. Farlow*); Meriden, Connecticut (*A. W. E.*).

The three species just quoted together with *L. gracilis* (Schleich.) Steph. (= *Jungermannia barbata*, var. *attenuata* Mart. of the Manual) have sometimes been regarded as distinct species, sometimes as well marked varieties of *L. barbata* (Schreb.) Dumort. Nearly all recent writers hold to the former view, recognizing five northern species in the "*barbata*"-group, but Pearson recognizes only four species looking upon *L. Floerkii* as a variety of *L. lycopodioides*, an opinion which has the sanction of Lindberg. With a little care it is not difficult to distinguish these five species, and, with the exception of *L. Floerkii* and *L. lycopodioides*, they show no tendency to vary into one another. *L. gracilis* is not uncommon in mountainous regions and is the smallest species of the group. It may usually be recognized at a glance by its upright flagelliform branches which bear gemmae near the apex and closely appressed leaves in the lower part. These branches, which are similar in appearance to the gemmiparous

branches of *Odontoschisma denudatum* and *Kantia Trichomanis* are sometimes very abundant, covering over an entire tuft of the plant, but sometimes they are very sparingly produced.

Of the other four species *L. barbata* and *L. Lyoni* agree with each other in having inconspicuous or obsolete underleaves and in lacking marginal appendages of any sort near the postical bases of the leaves, while *L. Floerkii* and *L. lycopodioides* agree in having large and conspicuous bifid underleaves and in developing clusters of slender branched cilia near the postical leaf-bases. *L. barbata* is rather more robust than *L. Lyoni*, but the most reliable differential characters are drawn from the leaves. In *L. barbata* these have their antical and postical margins of about the same length and approximately parallel, while the teeth at the truncate apex are three or four in number, subequal in size and obtusely or subacutely pointed. If we should pass a straight line through these teeth, it would lie parallel or nearly so with the axis of the stem. In the leaves of *L. Lyoni* the postical margin is strongly curved and is much longer than the antical, the sharply pointed teeth are commonly three in number and the postical tooth is considerably larger than the others. If we should pass a straight line through these teeth, it would form an acute angle with the axis. *Lophozia Lyoni* is commonly known as *L. quinquedentata*, but there is so much doubt as to what the original *Jungermannia quinquedentata* really was that it seems best to discard the name altogether, as both Pearson and Stephani have recently done, and to take up the later name of Taylor, about which there is no doubt whatever.

The differences between *L. lycopodioides* and *L. Floerkii* are those of degree rather than of kind. *L. lycopodioides* is the more robust of the two, its leaves are larger and more crispate, the teeth are often mucronate instead of being bluntly pointed, the basal cilia are more abundant and more finely divided and the divisions of the underleaves are more conspicuously ciliate. Typical specimens can be distinguished from each other at a glance, but one occasionally meets with forms which are difficult to refer definitely to either species and which apparently represent intermediate forms. As has already been noted both species are almost universally recognized in spite of this fact.

10. Lophozia Marchica (Nees) Steph. Bull. de l'Herb. Boissier, II. 2: 48. 1902. Stephani has recently reduced to this species, as

a synonym, *Jungermannia Mildeana* Gottsche,[1] a form which most European writers have considered distinct. If this reduction is made, and it certainly seems justifiable, then the writer's *J. Novae-Caesareae*,[2] although recognized by Stephani, should apparently share the same fate. Accepting *L. Marchica* in this broad sense it is now known from three New England stations: Beach Mt., Mt. Desert Island, Maine (*E. L. Rand*); Woods Holl, Massachusetts (*A. W. E.*); East Haven, Connecticut (*A. W. E.*). The species is essentially a bog-plant and is commonly found creeping through tufts of *Sphagnum*; in some cases however the plants may be completely covered with water, while in other cases, especially when growing in sandy bogs, they may be exposed to dryness. The plants vary markedly according to the amount of water which they receive, a liberal supply producing elongated stems with scattered leaves while a scanty supply produces short stems with closely crowded leaves. The cell-structure is also variable. Protected and shaded leaves show thin and delicate walls, while leaves exposed to the sun show thickened yellowish walls with more or less conspicuous trigones. A single leaf in fact may show these variations in cell-structure. The dark purple stems which are characteristic of typical *L. Marchica* are paler in some of the other forms and sometimes show no trace of purple; in other cases the color is limited to the bases of the rhizoids and the adjacent parts of the stem. Underleaves are occasionally present in all the forms among the stem-leaves, but they are often very few in number and have the appearance of being abnormal or adventitious. Floral underleaves or bracteoles are of course invariably present.

11. KANTIA SULLIVANTII (Aust.) Underw. This delicate species is now known in New England from the two following localities: Newton, Massachusetts (*W. G. Farlow*) and Woodbridge, Connecticut (*A. W. E.*).

12. SCAPANIA CURTA (Mart.) Dumort. Although this species is not included among the *Scapaniae* described in the Manual, it has been collected near Gorham, New Hampshire, by Professor Farlow and at Jackson in the same State by the writer.

13. ANTHELIA JURATZKANA (Limpr.) Trevis. This arctic and alpine species was collected by the writer on Mt. Washington in

[1] Verhandl. der k. k. zool.-botan. Gesellschaft in Wien, **17**: 626. *pl. 16.* 1867.

[2] Bull. Torrey Club, **20**: 308. *pl. 163.* 1893.

1889. The specimens although scanty show the paroicous inflorescence characteristic of the species and are infested with the peculiar fungous growth which seems to be almost invariably present. The plant has also been reported from Greenland, California and Alaska, but these are apparently the only North American stations that have been recorded. *Scapania curta* and *Anthelia Juratzkana* have recently been described by Howe,[1] who also points out the differences between the latter species and *A. julacea* (L.) Dumort., a plant which may likewise be expected in the White Mountains.

14. RADULA OBCONICA Sulliv. The range of this species as given in the Manual is from New Jersey to Ohio. It has been collected by the writer at Hamden, Connecticut.

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VARIATIONS OF GLAUX IN AMERICA.

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THOSE who are familiar with our sea-side flora have doubtless many times come across the blue-green patches of *Glaux* occupying areas of salt-marsh near high-water mark. At any time in summer or fall the plant attracts attention, and if it is found in June or early July it immediately claims our interest by the delicate flowers in the upper leaf-axils. Although the plant belongs to the natural order *Primulaceae* it has no corolla, but instead the calyx is much developed and beautifully colored, either white, rose-pink, or crimson, with more deeply hued centre.

The plant familiar to most botanists whose sea-shore collecting has been only in New England is simple or with a few erect branches, and it has oval or broadly elliptic-oblong leaves generally a centimeter long and rounded at the tip. This erect plant is common in salt-marshes and on muddy sea-shores from the Gulf of St. Lawrence to Nantucket — and it is said to extend even to New Jersey. It was, therefore, of no special interest, in early July last, to find the common erect plant growing below tide-limit on a muddy shore at Cutler, Maine.

[1] Mem. Torrey Club, 7. 1899.